Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
	09/930,065	GANAPATHY, NARAYANAN
Office Action Summary	Examiner	Art Unit	
	Diem K. Cao	2194	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>*18 February 2005*</u>.

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>*1-11,13 and 15-20*</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>*1-11,13,15-20*</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-11, 13 and 15-20 are pending. Applicant has amended claims 13, 15-16,

canceled claims 12 and 14 and added new claim 20.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

3.   Claims 1-10, 13 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Admitted Prior Art (APA) in view of Talluri et al. (U.S. 5,961,606).

4.   As to claim 1, APA teaches a client application program (an executing application; page

2, lines 1-2), a host channel adapter (a host channel adapter; page 2, line 1), registering a buffer

of memory related to the host channel adapter (the application must register a buffer of memory

... into the HCA; page 2, lines 4-6), allowing the application program access to the registered

buffer to perform a request (the application issues an I/O request on the buffer; page 2, lines 9-

10). APA further discloses the buffer is de-registered after the request is performed (the request

is performed and then the buffer is de-registered; page 2, line 10).

5.   However, APA does not teach maintaining the buffer as registered to allow the

application program to perform another request using the registered buffer. Talluri teaches

maintaining the memory segments and buffers allocated in the memory segments as registered to

allow the application program to perform another request using the registered buffer (The

sending node ... a specified size; col. 12, lines 40-45, the sending node initializes ... for the new

segment; col. 12, lines 60-61, the procedure allocates one or more receive buffers ... of buffers

allocated; col. 14, lines 43-47, the sending node ... reuse of the segment; col. 16, lines 8-11, and

Once the Status is set to active, the segment become available for use by message sending

procedures in the sending node; col. 16, lines 33-35, when the segment is re-used and so are the

buffers allocated inside the segment).

6.   It would have been obvious to one of ordinary skill in the art at the time the invention

was made to combine the teaching of APA and Talluri because it will increase the performance

of the system by avoiding the need to tear down and rebuild the MMU and virtual memory

mapping for old and new segments (col. 13, lines 46-49), and eliminate the message traffic

normally required to allocate individual receive buffers (col. 15, lines 60-63).

7.   As to claim 2, APA teaches the distribute network is a system area network (System Area

Network; page 1, lines 11-14).

8.   As to claim 3, Talluri teaches the act of maintaining the buffer as registered comprises

maintaining a list of registered buffers (#BufsCreated 404; col. 9, lines 43-45, and the procedure

allocated ... of buffers allocated; col. 14, lines 43-47).

9.   As to claim 4, Talluri teaches the list is a lookup table (Imported Segment Table; col. 9,

lines 24-45 and the sending node uses the #BufsCreated ... by the receiving system; col. 15, lines

44-47).

10.   As to claim 5, Talluri teaches receiving a request to free the buffer (the receiving node ...

receipt of a Segment Release request message; col. 14, lines 1-4), and de-registering the buffer so

that the application program cannot use the buffer to perform a request (The procedure begins ...

for the segment; col. 14, lines 4-19).

11.   As to claim 6, Talluri teaches the request to free the buffer is a request to change the

properties of the buffer (Status 412; col. 10, lines 1-13).

12.   As to claim 7, Talluri teaches the act of de-registering the buffer is performed by the

operating system (a message receive procedure 348; col. 8, lines 25-29, procedures 358,360; col.

8, lines 44-46 and the receiving node procedure ... for the segment; col. 14, lines 1-19).

13.   As to claim 8, Talluri teaches the act of de-registering the buffer is not performed by the

application program (The Request Segment Release procedure; col. 13, lines 50-60 and col. 8,

lines 18-21, 44-46, 62-63 and the receiving node procedure ... for the segment; col. 14, lines 1-

19).

14.   As to claim 9, Talluri teaches evaluating whether the buffer (inherent from segment)

should be de-registered, and if the buffer should be de-registered, de-registered the buffer (col.

14, lines 1-19).

15.   As to claim 10, APA does not teach the act of evaluating whether the buffer should be de-

registered is performed by the operating system using garbage collection techniques. It is well

known in the art that garbage collection techniques are used to reclaim the memory that is not

been used, and there is a method to mark which memory will be garbage collected. It would have

been obvious to one of ordinary skill in the art to combine the teaching of APA and well-known

techniques because it would improve the system development by reusing the available methods.

16.   As to claim 13, APA teaches an application can register a segment of memory along with

the buffers (Prior to directly ... buffer of memory; page 2, lines 4-5), and the segment of memory

and its associated buffers are de-registered after the request is performed (page 2, line 9),

wherein a request to de-register a memory segment and its associated buffers is explicitly made

by an application program (the sending node can execute ... release of the segment; col. 13, lines

38-41)

17.   However, APA does not explicitly teach a buffer registration module and a buffer de-registration module. Talluri teaches a registration module that register segment memory and buffers associated with the segments (a segment importing procedure; col. 8, lines 50-51 and a segment exporting procedure; col. 8, lines30-31), and de-registration module that de-register segment memory and buffers associated with the segments (procedure 358; col. 8, lines 44-46 and procedure 374; col. 8, lines 62-63).

18.   It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of APA and Talluri because it will increase the performance of the system by avoiding the need to tear down and rebuild the MMU and virtual memory mapping for old and new segments (col. 13, lines 46-49), and eliminate the message traffic normally required to allocate individual receive buffers (col. 15, lines 60-63).

19.   As to claim 15, Talluri teaches the request to de-register a buffer is to free the buffer (execute the Request Segment Release procedure to initiate the de-allocation and release of the segment; col. 13, lines 38-41).

20.   As to claim 16, see rejection 6 above.

21.   As to claim 17, see rejections of claims 13-14 above. Talluri further teaches a kernel interface module for receiving a request, the request having information related to a virtual address value and a length value (a message receive procedure 348; col. 8, lines 25-29, col. 9,

lines 2-11, and col. 12, lines 40-45), a maintenance module for maintaining a record of registered

buffers (procedures 360 and 376; col. 8, lines 44-46 and 62-63 and Import Segment Table and

Export Segment Table; col. 9, line 12 – col. 10, line 24).

22.   As to claim 18, Talluri teaches the kernel interface is part of an operating system (a

message receive procedure ... operating system's kernel; col. 8, lines 25-29).

23.   As to claim 19, Talluri teaches the registration module, maintenance module and de-

registration module are part of the operating system (obvious from the fact that those modules

are not part of applications).

24.   As to claim 20, see rejections of claims 1 and 9 above.

25.   Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior

Art (APA) in view of Talluri et al. (U.S. 5,961,606) further in view of Provino et al. (U.S.

6,535,929 B1).

26.   As to claim 11, see rejections of claims 1 and 5 above. However, APA and Talluri do not

teach determining whether the buffer is registered. Talluri teaches the system includes a

Imported Segment Table for keeping track of the segments and buffers allocated within those

segments (col. 8, lines 55-56 and col. 9, lines 43-45). Provino teaches a lookup function is used

by the register and de-register methods (col. 6, lines 62-67, and col. 7, lines 29-34). It would

have been obvious to one of ordinary skill in the art at the time the invention was made to

combine the teaching of APA, Talluri and Provino so the applications don't have request for the

new buffer/segment when they already have access to them.

Response to Arguments

27.   Applicant's arguments filed 2/18/2005 have been fully considered but they are not

persuasive.

28.   In the remarks, Applicant argued in substance that (1) Talluri does not teach "maintaining

the buffer as registered to allow the application program to perform a request" because recycle

segment of memory is very different than allowing the program to perform another request using

the registered buffer, (2) Tullari does not teach "a request to de-register a buffer is explicitly

made by an application program", (3) Tullari does not teach "a maintenance module for

maintaining a record of registered buffers", and (4) Provino does not teach "determining whether

the buffer is registered".

29.   Examiner respectfully traverses the Applicant's arguments:

        - As to the point (1), although Talluri does not each maintaining a buffer as registered,

Talluri teaches recycle the segment memory and its associated buffers by maintain its existence

in the tables to allow the program to reuse it for further requests (The sending node ... a

specified size; col. 12, lines 40-45, the sending node initializes ... for the new segment; col. 12,

lines 60-61, the procedure allocates one or more receive buffers ... of buffers allocated; col. 14,

lines 43-47, the sending node ... reuse of the segment; col. 16, lines 8-11, and Once the Status is

set to active, the segment become available for use by message sending procedures in the

sending node; col. 16, lines 33-35, when the segment is re-used and so are the buffers allocated

inside the segment), i.e. maintaining the segment memory as registered. It would have been

obvious to one of ordinary skill in the art to apply the technique of Talluri for its advantages, i.e.,

will increase the performance of the system by avoiding the need to tear down and rebuild the

MMU and virtual memory mapping for old and new segments (col. 13, lines 46-49), and

eliminate the message traffic normally required to allocate individual receive buffers (col. 15,

lines 60-63).

- As to the point (2), Talluri teaches the application program requests to de-register the

segment memory (the sending node can execute ... release of the segment; col. 13, lines 38-41).

As discuss above in point (1), one of ordinary skill in the art would apply the technique of Talluri

for its advantages, i.e., will increase the performance of the system by avoiding the need to tear

down and rebuild the MMU and virtual memory mapping for old and new segments (col. 13,

lines 46-49), and eliminate the message traffic normally required to allocate individual receive

buffers (col. 15, lines 60-63). Applicant further argued that the application program deregister

the buffer without going through the kernel interface module, which is incorrect because the

cited passage by the Applicant is to allow the application to access the queue without going

through the kernel interface module, it does not teach the deregister the buffer is performed by

the program. Applicant is further directed to the specification, page 13, lines 14-22 for disclose

of the deregister the buffer process.

- As to the point (3), although Talluri does not explicitly teach the maintenance module,

Talluri teaches Imported Segment Table and Exported Segment Table are maintained by the

nodes (adding and removing entries of the tables that related to the segment memory), it would

have been obvious there is a software module that performs the maintenance of the tables.

- As to the point (4), Provino clearly teaches the register method using the lookup method

to check whether it has been registered before (col. 6, lines 62-67, and col. 7, lines 29-34). It

would have been obvious to apply the teaching of Provino to avoid register the same application

twice.

Conclusion

30.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Diem K. Cao whose telephone number is (571) 272-3760. The

examiner can normally be reached on Monday - Friday, 8:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any response to this action should be mailed to:
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Any inquiry of a general nature or relating to the status of this application should be

directed to the TC 2100 Group receptionist at 571-272-2100.

Due to the realignment of WG 2120, effective March 20, 2005, AU 2126 will become

AU 2194.

Diem Cao